SAT Framework Research Report

I. Executive Summary

The Scalar-Angular-Twist (SAT) model reimagines the foundational architecture of physical law. Time emerges as a propagating foliation (u^mu), matter as angular misalignment (theta4), and structure as topological twist (tau). The theory is constructed with explicit ontological commitments and prioritizes falsifiability, symbolic rigor, and simulation-driven constraint validation.

II. Theoretical Foundations

SAT defines theta4(x) as a scalar encoding local angular mismatch, associated with domain walls and matter analogs. The u^mu vector field defines temporal foliation, subject to normalization constraints. tau variables define discrete Z3-valued topological configurations. Coupling terms such as grad^mutheta4grad_muu^nuu_nu and Lagrangian multipliers maintain structural coherence.

III. Experimental & Simulation Results

Lab 1 simulations reveal tau domain stabilization under gradient constraint lambda(x). Composite theta4-tau excitations match predicted domain wall behavior. Fringe compression simulations yield Deltaphi ~ 0.246 rad, within DSLR fringe-detectable margins. Lab 2 establishes second-class constraints in u^mu with Dirac brackets and confirms closure without tertiary constraints.

IV. Interdisciplinary Workflow

The research process is coordinated via ActiveEdgeGPT, with simulation and theory labs feeding back into a central coordination hub. ConsensusPro serves as adversarial filter, while Colab enables executable prototype testing. NotebookLM ensures memory and traceability. EmeritusGPT ensures philosophical and symbolic fidelity to foundational assumptions.

V. Actor Roles & Ontological Commitments

Simulated figures (Hawking, Carroll, Boyd, Lemmon, Petrova) represent epistemic lenses, not individuals. Labs 1 and 2 correspond to simulation and refinement. Colab enables live code testing. NotebookLM

provides document traceability, and ConsensusPro identifies scientific mismatches.

VI. Conclusion & Forward Plan

SAT is an ontologically grounded and physically falsifiable theory. Immediate steps include: composite excitation classification, limb scattering simulation for Mars/Venus, constraint analysis extension to curved spacetime, and publication of interferometric Deltaphi results. Testing protocols are provided for BEC labs, optical birefringent stacks, and CRISM/POLDER data.